



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/642,656	08/19/2003	Seo-Hyun Cho	1349.1276	3051

21171 7590 07/18/2006

STAAS & HALSEY LLP  
SUITE 700  
1201 NEW YORK AVENUE, N.W.  
WASHINGTON, DC 20005

EXAMINER
----------

MCPHERSON, JOHN A

ART UNIT	PAPER NUMBER
----------	--------------

1756

DATE MAILED: 07/18/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

5

<b>Office Action Summary</b>	<b>Application No.</b> 10/642,656	<b>Applicant(s)</b> CHO ET AL.	
	<b>Examiner</b> John A. McPherson	<b>Art Unit</b> 1756	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 01 May 2006.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-5, 7-10 and 12-30 is/are pending in the application.  
     4a) Of the above claim(s) 1-3 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 4, 5, 7-10 and 12-30 is/are rejected.
- 7) ☒ Claim(s) 12, 13 and 25 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
     a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Response to Amendment***

1. This Office Action is responsive to the Amendment filed 5/1/06.
2. The Amendment filed 5/1/06 successfully overcomes the rejection set forth in paragraph 3 of the Office Action mailed 2/1/06. Accordingly, this rejection is withdrawn.

### ***Claim Objections***

3. Claims 12, 13 and 25 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form.

Claims 12 and 13 each present the limitation "wherein an amount of the UV is between 2mJ/cm<sup>2</sup> and 4000mJ/cm<sup>2</sup> in order to adjust a hardening depth". However, this limitation is already present in claim 4, as amended, at lines 7-8.

Claim 25 presents the limitation "wherein the exposing the photo resist to light comprises exposing the photo resist to UV light". However, this limitation is already present in claim 19, as amended, at line 5.

### ***Claim Rejections - 35 USC § 112***

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the

Art Unit: 1756

art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 4, 5, 7-10 and 12-30 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

As amended, claims 4 and 19 each recite the step "wherein the forming of the photo resist includes forming the photo resist to have a thickness of from 35µm to 100µm". However, the disclosure does not describe 35µm as an end point of the thickness range. While the disclosure sets forth a photo resist thickness of 10µm to 100µm (e.g. see paragraph [0044]), the disclosure does not teach an appreciation of 35µm. Therefore, this limitation is viewed as new matter.

### ***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 4, 5, 7-10 and 12-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,162,589 to Chen et al. (Chen). Chen discloses a method of manufacturing a thermal inkjet printhead comprising the steps of forming a layer of slow-crosslinking polymer, for example an epoxy or a polyimide, on a substrate;

Art Unit: 1756

exposing the polymer layer through a single mask having multi-density levels to allow different dosages of electromagnetic energy to expose the polymer; developing to remove non cross-linked material to form a fluid-well chamber and an orifice chamber; and etching the through backside of the substrate to create a fluid feed channel. See column 8, lines 5-21 and Figures 9E-G. An exemplary exposure sufficient to crosslink the slow-crosslinking layer is 300 mJoules. See column 7, line 65 to column 8, line 4.

Additionally, as shown in Figure 9E, the multi-density level mask transmits electromagnetic radiation having regions of strong intensity **11** (corresponding to the first part having a relatively high UV transmission rate of the present invention), regions with a low dose of electromagnetic energy **12** (corresponding to the second and forth parts having the same relatively low UV transmission rate of the present invention), and provides a region where electromagnetic radiation is not transmitted at the orifice opening **42** (corresponding to the third part having a UV transmission rate of 0% of the present invention), wherein the region where electromagnetic radiation is not transmitted (i.e. the third part) is between the regions with a low dose of electromagnetic energy (i.e. the second and forth parts).

Furthermore, Chen discloses that the height of the upper and lower orifices, and thus the thickness of the crosslinking polymer layer into which they are patterned, is a result effective variable in the design of inkjet printheads. See column 7, lines 20-45. However, Chen does not disclose that the layer of crosslinking polymer has a thickness of 35 $\mu$ m to 100 $\mu$ m.

It would have been obvious to one skilled in the requisite art to arrive at a crosslinking polymer layer thickness of 35µm to 100µm in the method of Chen, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum of workable ranges and values of a result effective variable involves only routine skill in the art. *In re Aller*, 105 USPQ 233 and *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

### ***Response to Arguments***

6. Applicant's arguments filed 5/1/06 have been fully considered but they are not persuasive. With respect to the rejection over Chen, Applicant argues that Fig. 9 of Chen is a cross sectional view of a round element, thus the lower intensity magnetic energy on the left and right sides in Fig. 9E is the same part. Therefore a single part is disclosed, as opposed to the claimed second and forth parts of the present invention.

However, the second and "forth" parts of the present invention both represent the relatively low exposure area **108b'** when viewed at a cross-section of the photo resist through the nozzle **107**. Nozzles **107** are openings in the chamber/nozzle plate **109** over the ink chamber **104**, thus the polymer portion **108b** of the chamber/nozzle surrounds the nozzle, and the second and "forth" parts **108b'** on either side of the nozzle are also a single part, the same as in the applied prior art (i.e. the "forth" part is a portion of the second part set forth in paragraph [0065] of the specification, both labeled **108b'** in the figures of the present invention).

***Conclusion***

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

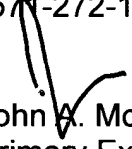
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to John A. McPherson whose telephone number is (571) 272-1386. The examiner can normally be reached on Monday through Friday, 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on (571) 272-1385. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1756

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



John A. McPherson  
Primary Examiner  
Art Unit 1756

JAM  
7/6/06